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ABSTRACT

This special issue is a collection of reports on the applications of technology to schools, written by educators affiliated with the Technology Leadership Network (a group sponsored by the National School Boards Association). In "Meet the Pioneers of More Productive Schools," James A. Mecklenburger, the director of the National School Boards Association's Institute for the Transfer of Technology to Education, introduces these educators and discusses the far-reaching implications of their projects. Following this introductory essay are reports from a few of the many school districts that participate in the Technology Leadership Network: "Commitment to Technology Multiples Curriculum Power" (Corona-Norco Unified School District, California); "Computers and Robotics Roll Back Frontiers of Learning" (Columbus Public Schools, Ohio); "Resolute Leadership Erases Resistance to Technology" (Mahopac Central School District, New York); "Electronic Data Transmission Is Beating That Bane of School Life--Endless Reports" (Glenview Public Schools, Illinois); "Students Use Media Technology to Expand and Enrich Their Course Work" (Montgomery County Public Schools, Maryland); "Computers Lend Handicapped Kids the Latest in Helping Hands" (Fairfax County Public Schools, Virginia); "This Computer Network Turns a Management Nightmare into a Teacher's Dream" (Central Kitsap School District, Washington); "Here's What Might Be the Ultimate in Computer Management Systems" (Indian Springs School District, Illinois); "From Game Shows to Teacher Recruiting, This Media Program Scores a Big Hit" (Charlotte-Mecklenburg Schools, North Carolina); "Interactive Video Cuts Ambitious Science Experiments Down to Classroom Size" (Arlington Independent School District, Texas). The concluding section, "Count the Ways Technology Can Improve Your Schools," is made up of 30 brief reports on other ways that school districts are improving education through the use of technology. (AA)

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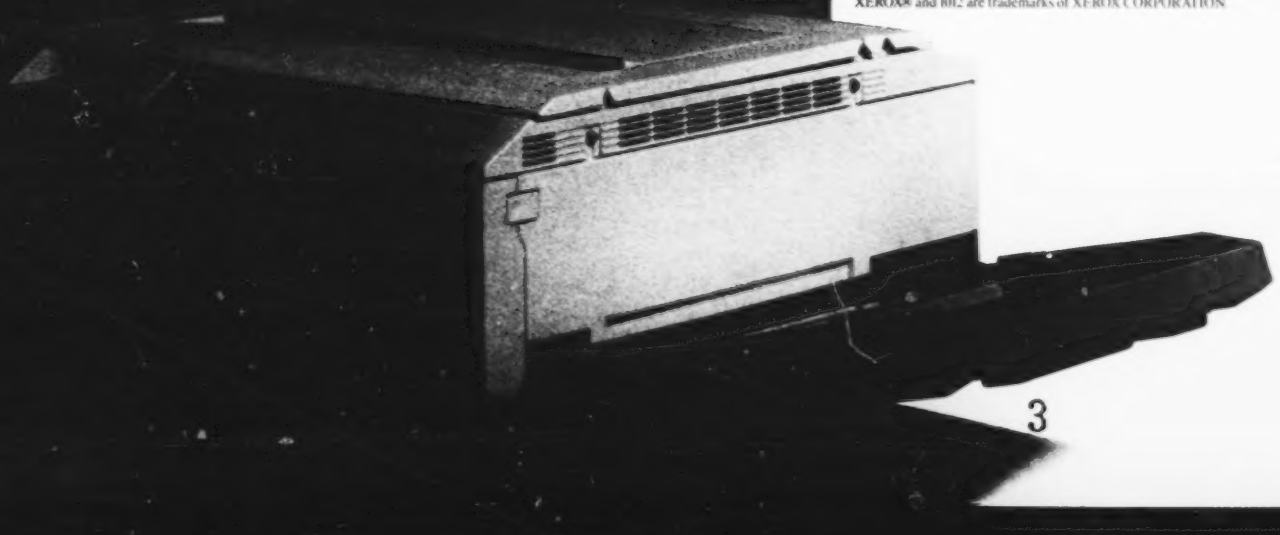

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Introduction

Modern technology is beginning to transform public education just as surely as the Gutenberg press revolutionized communications in an earlier age. Those who govern and administer our nation's schools in these exciting times have a difficult task ahead. The challenge is to use technology, but to use it wisely and well. The goal is to make technology a means to a critically important end—that of improving schools to prepare our young people for the future.

To this end, we are pleased to publish this special report, *The Electronic School: Innovative Uses of Technology in Education.* In it, we have distilled many of the most useful and interesting ideas and experiences of educators who are leaders in the field of applying technology to the delivery of school services. (You can get more information about any of the programs included in this publication by writing to the person listed at the end of each article. Addresses and telephone numbers are printed in ***boldface.***)

The dozens of ideas compressed into these pages are gleaned from the work of the more than 100 school districts in more than 30 states that participate in the Technology Leadership Network. When NSBA—in concert with state school boards associations—launched this new group last year, we wanted to give leading school districts a chance to work together and to share problems and solutions. We hoped not only to be of service to them, but to learn from them as well.

We have, indeed, learned from them, and we believe you will, too. Because they are among the first school districts to experiment with ways to make schools more productive through technology, their experiences will be a continuing resource for you. Their reports make it very clear that the school board and the superintendent play the central role in planning and implementing technology programs and in mobilizing public and financial support for technology.

We also are pleased to announce a new event, "Making Schools More Productive," sponsored by NSBA, Nov. 5-7, in Dallas.

This conference, spearheaded by NSBA's Institute for the Transfer of Technology to Education, has earned the cosponsorship of nine national organizations: The American Association of School Administrators, the American Federation of Teachers, the Association for Educational Communications and Technology, the International Technology Education Association, the National Association of Elementary School Principals, the National Association of Secondary School Principals, the National Education Association, the National Association of State Boards of Education, and the Public Broadcasting Service.

We encourage you, personally, to participate in this special event, where you will have a choice of more than 100 workshops, seminars, and demonstrations. We believe a team of your district's leaders will benefit by attending together, so we have priced the conference to encourage your bringing board members, administrators, and staff members—those upon whom you rely to implement school improvement efforts.

Many of the people you will read about in *The Electronic School* will be on hand, too. You'll have the opportunity to discuss their programs at length and to hear their experiences during this special conference.

As you know, numerous recent national reports on school reform have agreed that technology, used wisely, can help make schools more productive. We hope that both this special report on technology and our upcoming conference will help you meet the challenges ahead and continue to create ever more productive, efficient, and effective public schools.

Very truly yours,

Jon Howe

Jonathan T. Howe
President
National School Boards Association

Thomas A. Shannon
Executive Director
National School Boards Association

Meet the pioneers of more productive schools

Say hello to some of the most innovative, practical uses of school technology—and to the pivotal school leaders who are revitalizing and transforming education

BY JAMES A. MECKLENBURGER

Dozens of leading school systems across the country are engaged in remarkable efforts to use technology to revitalize and transform education. In these articles in *The Electronic School,* you will find a vast array of varied and complex technology. (To obtain more information about any of these innovative uses of school technology, look for the ***boldface*** names and addresses of contact people listed at the end of each article.)

But far more important than the electronic equipment itself is the new generation of educators you will meet. These school board members and superintendents, principals and administrators, teachers and librarians are at once pragmatists and dreamers.

They are pioneers of more productive schools.

These educators want to accomplish the fundamental reforms in education that a host of recent national reports have said are necessary to prepare our students for the future. Equipped with a willingness to change and a receptivity to new ideas, they are impatient with schools that often contain more nostalgia than learning. They are, with the aid of technology, turning their impatience into innovation. They are educating more craftily, more swiftly, more effectively, more professionally, and more joyously than ever before.

These new leaders are excited by the prospect of educating students for the electronic, visual, information-rich era in which we live. This is, after all, the decade of videotape cartridges and audiocassettes, videodiscs and hand-held remote controls, robotic factories and electronic mail. This is an age of technologies more dynamic than those which, in an earlier age, shaped the schools: slate boards, paper and pencils, workbooks, and textbooks.

Until recently, schools, so accustomed to depending almost entirely on people and books, have treated electronic technology as incidental. They viewed television and film and even computers as supplementary to the main business at hand. But in the stories you will read here, the technology is not supplemental; it is an integral part of what schools are trying to accomplish. Electronic systems of all kinds are becoming essential tools, as necessary to teaching and learning as trucks are to truck drivers, pianos to pianists, radar to pilots, and lasers to eye surgeons.

Technology is, in fact, affecting every aspect of school life. School systems are using technology to speed and improve budgeting, record keeping, program evaluation, and numerous other aspects of school administration. Technology boosts teacher efficiency by reducing paperwork and increasing the timely flow of information. It provides individualized instruction for students and gives them opportunities to learn new subjects and to approach old subjects in dynamic new ways. Technology is reaching special school populations—bringing high-quality

James A. Mecklenburger is director of the National School Boards Association's Institute for the Transfer of Technology to Education.

courses to students in rural, isolated areas; helping special education students, the physically handicapped, the hearing-impaired, and the blind live and work more productively; and presenting exciting challenges to the gifted and talented. Technology is making libraries more an essential part of the learning environment by transforming them into media centers or computer laboratories. It is building new links with each community's adults, businesses, universities, and television stations. And, hardly least, technology is improving the important work of the school board.

The introduction of technology, by its very nature, has made the school environment more professional, more dynamic, more interested in action and results. School board members and administrators have demonstrated leadership, foresight, courage, and creativity in planning and implementing technology programs. Teachers have become managers of information as well as dispensers of knowledge. In many cases, they have learned new skills that enable them to adapt their curriculums or to create new programs.

You can feel the excitement that the use of technology has created. Just listen to Gayle Horn, an elementary school teacher in California's Corona-Norco Unified School District, describe interactive video, a new tool that lets her design instruction for students by blending voice, text, music, graphics, video, and computing:

"My students are not overwhelmed by interactive video. They are fascinated by it. They sit at a computer terminal and see breathtakingly real sequences of a volcano erupting or of the 1906 San Francisco earthquake. They hear their teacher's voice explaining the dynamics of our changing earth. They respond to questions by touching the volcano, the fault, and the continental plate on the monitor screen. Are these students involved in the lesson? Are they learning? Yes."

Revamping schools with the aid of technology is indeed exciting, but it is also hard work. The management of technology requires that schools undergo profound changes in planning, staff training, budgeting, and purchasing practices, among others.

At the National School Boards Association (NSBA), we have developed a way to help school districts understand and use technology to make their schools more productive. The Institute for the Transfer of Technology to Education (ITTE) is NSBA's effort, in concert with all the state school boards associations, to help educators extend their imaginations and their achievements, to realize the opportunities technology can create, and to put those technologies to use.

One major ITTE service is the Technology Leadership Network. This year-old cadre of more than 100 districts—large and small, urban, suburban, and rural—from more than 30 states is on the cutting edge of the use of technology. Through meetings, publications, and projects, these districts learn from each other, engage in joint efforts, preview new approaches and new products, and consider how best to use the technologies that are now or soon will be available.

The Electronic School: Innovative Uses of Technology in Education was compiled from information provided by nearly 100 educators in these network districts. By sharing their experiences, these leaders in technology hope to inform school districts nationwide about the opportunities technologies make possible. Similarly, "Making Schools More Productive," a major new national conference that NSBA, through ITTE, is sponsoring, will be an opportunity for school districts to benefit from the experience of these districts. The conference, cosponsored by nine national organizations, will be held Nov. 5-7 in Dallas. On the agenda are seminars, discussions, and debates that will demonstrate how school districts are using new technologies to address the challenge of school innovation.

From this publication and from the upcoming conference, you will be able to foresee not only what is possible but also what hurdles, difficulties, and pitfalls you will need to surmount. These include:

- Training, training, and more training of personnel;
- Keeping pace with the ever broader and ever more powerful array of technologies that schools might be able to use;
- Keeping priorities straight so that pressure from technology vendors does not override educational considerations;
- Rethinking and revamping policies, curriculums, and administrative practices;
- Remodeling libraries, buildings, and electric power supplies;
- Keeping essential equipment in good repair and readily available;
- Locating and buying enough video and computer software and courseware to satisfy objectives;
- Dealing with key issues such as access to staff and student records and security; and
- Finding the money to afford it all.

Wayne Shumate, technology coordinator for the Charlotte-Mecklenburg schools in North Carolina, summarizes the situation well. "How can educators meet the challenges presented by technology?" he asks. "First, we must come to realize that technology can be used to make a difference. It can have an impact on the learning process and the essence of teaching itself. If we're not fully convinced of that, then any venture into the technology wars would prove totally counterproductive."

Shumate also argues that educators must "face facts. Yes, products will become outdated very quickly; there will always be something new around the corner. Yes, the new technologies require countless hours of training, substantial amounts of money, and mountains of strategies to use them well. Yes, you must integrate the technology into the curriculum, have a focused direction, be willing to take risks, have enough staff to monitor your programs, and support teacher training. And, yes, you must be technically competent to analyze industry trends and to counter vendor pressure. No, you can't do it alone. And, no, you can't afford to wait any longer.

"You see, we have started a new era." □

Commitment to technology multiplies curriculum power

Corona-Norco, Calif.

Planning and support from board members, administrators, and teachers let schools capitalize on an array of technologies from laser video to a visiting robot

Students toting home their books in a book bag used to be a familiar sight in California's Corona-Norco Unified School District. These days, though, some students are just as likely to be carrying home a computer keyboard.

This computer checkout program is only one small part of the school district's commitment to technology. The district is using a wide array of the most current technology to help its 17,000 students learn more effectively, solve problems more creatively, and think at higher levels. Learning to use robots or creating electronic term papers or designing products with computer-controlled equipment—these activities have become part of school life for the district's students.

"While technology will never replace the loving and encouraging words and interaction of a good teacher, it is an immensely powerful tool for education," says Superintendent Don Helms. "The teacher who captures a student's interest and uses technology for motivation and direct teaching can help the child in ways not possible in the past."

Four years ago, Corona-Norco, like many school systems, had done little with technology. At that time, though, the school board decided to make the introduction of technology a high priority; it believed technology could be useful in teaching children the basic skills they would need for life in the next century. The board's goal was to introduce technology in all grade levels and in all subjects in which it would improve teaching and learning and give children greater opportunities, Helms explains.

The school board certainly wanted

Students are charmed by an itinerant robot that goes from school to school as part of a Corona-Norco (California) program in "robotics literacy."

to use technologies already proven successful in schools. But beyond that, it was willing to allow teachers to experiment with technologies (new to schools, perhaps) but already well established in the world of business and industry and in the military.

Because the district was starting virtually from scratch, it had to design a comprehensive plan. The board and administrators assessed what the Corona-Norco schools needed, developed short-term and long-term training plans, made budgetary commitments, and developed a schedule for implementing its new programs. Teachers and administrators also took a close look at the curriculum.

Although some school districts use computers and other technologies as tools—a better way to teach the existing curriculum—Corona-Norco saw the issue somewhat differently: "It became clear that we would have to analyze the scope, sequence, and content of our curriculum to maximize the use of new technologies," Helms notes. "We developed sample lesson plans using technology; they were important to the training that was necessary to change the ways teachers teach and students learn."

Students might still study the English novelist Charles Dickens, for example, but they no longer simply read his books, hear a lecture on his life and times, and write a book report. The new technology enables students to use a computerized data base to search easily for related books on English society; use a word processing program to write and revise their work; use software to help them analyze the main points of Dickens's books; and create their own stories, with pictures and graphics, based on those points.

When the work is done, teachers and students can use a software program to analyze the structure of their writing: Are the sentences too long? Is the paragraph clear? The technology thus becomes an integral part of teaching.

To finance the acquisition of equipment, the school district looked for help from a number of sources. Parent groups bought or donated thousands of dollars' worth of hardware and software. Major companies such as AT&T, Ford, Teledyne, and General Dynamics loaned or donated equipment or helped the district buy it. Local businesses contributed, too: They know that a "better educated and trained graduate is an economic asset to the community and to the economy," says Helms. Grants from the California State Department of Education also gave the district a financial boost. From all these sources and its own budget, the district now spends approximately $210,000 a year for its technology program.

Corona-Norco's emphasis on technology has produced innovative programs in a great many areas. In one elementary school, for instance, 350 students participate in a computer-based student banking program, which the school district funds in partnership with the Bank of America. Participating students learn about money management and banking practices through hands-on experience with a bank-supplied personal computer. Once a week, during Bank Day, students make deposits and withdrawals through the computer (with the help of parent volunteers trained by local bank staff members). The bank also supplies software programs and banking forms in addition to the computers.

"Student banking at Parkridge Elementary School is not only convenient, but it also helps students understand how modern technology can be applied to banking," explains Principal Dennis Crane. "The program illustrates how easy and convenient it will be in the future to bank at home on a microcomputer that communicates with the bank through regular telephone service."

Another elementary school has a computer checkout program: It allows parents of students in grades 4-6 to take home computer equipment and software to help teach basic skills in mathematics and language arts. The equipment and software are located in a classroom and are used for computer-assisted instruction during the regular school day. The equipment, along with a cable that connects the computer to a home television set, is available to parents each evening and during holidays, weekends, and vacations during the school year. To have access to the equipment, parents first must attend an orientation meeting to become familiar with the technology and the program's rules. The equipment must be brought back to school before classes start in the morning.

The program serves several purposes, explains Tom Wilson, coordinator of technological education in the school system. It reinforces basic skills, motivates learning, increases the time spent on instruction, and gives parents and children the chance to learn together. The program has had only one major problem since it began last year: "We don't have enough computers to meet parent demand," he says. "The demand is high."

Other Corona-Norco elementary school students are pioneering a new science program that uses interactive video—a combination of computer and laserdisc technologies—to create a multimedia lesson. The system, developed by the IMSATT Corp., lets teachers design lessons: They choose what they need from among 54,000 frames of visual data contained on a videodisc, add their own voices, and use graphics to make the lessons clear. The equipment also contains a "touch screen" that requires students to respond to what they are seeing and hearing.

Elementary school teacher Gayle Horn says she does not expect interactive video to replace the teacher. "It will never be able to make a decision about a student's needs, weaknesses, or special strengths," she says. "But there are some astounding things it can do. It will give an individualized lesson. It will free the classroom teacher from having to reteach a lesson for those who were absent or who need remedial help. It will allow students to work independently. And most important, it will bring a video image to the student, which will have a greater impact on him than if he simply heard the lesson."

Students today, she finds, do not have the computer phobia that adults sometimes exhibit. "They take to the keyboard the way we

took to the ballpoint pen," she notes.

But she does offer one caveat to other school districts that want to use interactive video: Don't let technical failure ruin your day or your lesson. "Be sure you have people in your community who have expertise as technicians, programmers, and designers," she warns. "You may have the best program in the world, but you'll go nowhere if your system isn't functioning and only one overworked person in the district can fix it. A broad base of support can prevent many hours of frustration and helplessness."

High school students in Corona-Norco also are using interactive video to study science. Norco High School is one of ten schools in California included in the state education department's secondary science videodisc project. Teachers have 108,000 visual images from which to create lessons. "If you place 108,000 images on videodisc, you effectively create a 'three-second library' that any teacher or student can explore almost instantly," says Laurence V. Pomeroy, a chemistry and physics teacher at Norco High School. "You can use the 'library' to fit an individual's particular way of learning, or you can regulate it to help an entire class get caught up in a discussion."

At Norco High School, 100 students in grades 10-12 are examining sample interactive video programs in chemistry, physics, and biology. The programs still are being evaluated, Pomeroy says, but "we're already seeing preliminary clues that they're successful. Chemistry lab teams learned about different kinds of matter with great success, judging by their tests. Biology students are creating their own ten-minute miniprograms to present to the rest of the class; that's been a popular activity. The astronomy club put on a special evening to acquaint parents with interactive video, and that was well received," he says.

Students also use video to study history. An advanced placement history class is using a new "Video Encyclopedia of the 20th Century," from CEL Educational Resources, which contains 39 two-sided laserdiscs, to make history an "exciting, relevant experience," says teacher Reinhold Klein. The video encyclopedia, he argues, is "potentially one of the finest technological innovations to enter the realm of education in recent memory."

The teacher has as a resource a laserdisc player that "puts significant historical events at his fingertips," Klein says. "More than 2,000 major events in the political, economic, and social development of 20th-century America are covered. Through the proper use of this laser technology, students will not only read about Franklin Roosevelt's fireside chats; they will be with the President as he makes history. As a teacher discusses the Ervin Committee hearings on the Watergate scandal, he turns to the television monitor and laserdisc player, pushes the proper buttons on his remote control unit, and there is John Dean testifying. This is a dynamic teaching tool." Students, according to Klein, also can use the filmed sequences along with library research to produce their own video term papers or to do other projects.

The school district is using technology to revolutionize its industrial education program, too. A new course in metalworking and drafting allows students to design, draft, program, and manufacture a product using a variety of computerized equipment. "We have students design and manufacture a high-quality, marketable product—from salt and pepper shakers to chess pawns and candle holders—while role-playing in an industrial setting," says industrial education teacher Joe Doerr. Adds his teacher colleague, Bob List: "Students learn to be creative and to develop communications and problem-solving skills."

Students in an automotive technology course use a 1986 car donated by a local Ford dealership and accompanying videodisc training programs to learn to repair automobiles. The teacher is free to check on individual practice activities and to lead discussions on car maintenance. "The students are learning more in less time," reports teacher James Gonzalez. "In addition, as advanced technology is introduced on new cars, our updated supply of videodiscs will allow our students to stay current."

The district also has a program in robotics literacy—the study of the design and use of robots. The district bought a programmable robot that can move its arms, hands, and head and that contains a built-in cassette player, allowing it to speak. The robot visits each school at some point during the school year; each school has a robot operations expert to help teachers and students understand how the robot works and what it can do. "We wanted our students to gain a perspective on robots that transcends movie myths and media marketing," explains coordinator Tom Wilson. "They should see that robots have important uses; they should feel comfortable in an age of thinking machines."

Corona-Norco is by no means through with its ascent into high tech: In the wings is a new high school, expected to open next fall, that will use fiber optics technology throughout its communication system. AT&T will help fund the school and will use it as a demonstration school for the latest in communications technology. District administrators say that fiber optics—flexible, lightweight glass fibers that carry 1,000 times the information possible using traditional copper wire—will bring the video age to Corona-Norco. Live telecasts from the school's media studio, interactive video in every classroom, schoolwide debates using video signals sent from classroom to classroom—all these things might be possible.

And the students can't wait. "Children today, with their imagination and exposure to movies and television, accept and adapt to technological advances of the present," concludes Superintendent Helms. "And they'll be ready for those advances not yet on the drawing boards of our most sophisticated scientists and engineers."

For more information, contact Don Helms, Superintendent, Corona-Norco Unified School District, 300 Buena Vista Ave., Corona, Calif. 91720; 714/736-3251.

Computers and robotics roll back frontiers of learning

Columbus, Ohio

Long experience and a vital alliance of universities, corporations, and schools help handicapped students and bring tomorrow's classrooms to life right now

Fifteen years ago, a few hundred Columbus (Ohio) high school students learned the computer language Basic on a computer hauled from school to school in a suitcase the size of a steamer trunk. Today, more than 66,000 Columbus students in grades K-12 are using the latest in computer technology to enhance the curriculum in all areas.

Thirty students in the ninth grade are pioneers in a novel Classroom of Tomorrow, where computers are as available as pencils and where a team of teachers is busy creating new computer-based educational materials every day. Others—functionally illiterate high school dropouts and adults—are using a new computer-based literacy system to learn to read and write. Still others—a small group of physically handicapped students—are learning how to use robotic arms and other devices to help them live, learn, and work more productively.

"In just a few short years, we've seen how computers can motivate and excite students and turn them on to education," says Superintendent James G. Hyre. "We've also seen the same excitement generated in our teaching staff. Computers are becoming as much a part of their jobs as a blackboard and an overhead projector."

The computer revolution in the Columbus schools came about through a combination of

In a Columbus (Ohio) program involving adult literacy, a woman responds to a question posed by the computer by touching the correct answer on the screen.

determination, good timing, and a little help from friends in the right places. The business community was eager to help establish Columbus as a high-tech center in the 1980s and beyond. Nearby, Ohio State University was facing a good deal of public demand for affordable computer courses. And, in the school district, teacher interest was high: A pilot computer course, offered in 1982, drew more than 600 participants instead of the 90 that school administrators had expected.

The result of all the interest in computers was Summer Tech—a partnership between the school district, the university, and the business community. The program, which started in 1983, provided low-cost computer training to students, senior citizens, business people, homemakers, and teachers. With 10,000 people enrolled in 70 courses, Summer Tech became the largest community computer education program offered in the U.S. Local businesses and foundations gave money to help purchase microcomputers; companies also donated software and services.

The benefit to the Columbus public schools was enormous. The district gained a growing reputation as a national leader in computer education, and it also acquired more than 2,500 microcomputers for its students to use year-round. "We're still reaping the benefits of that first Summer Tech program almost four years later," says Howard Merriman, assistant superintendent and one of the originators of the program, which continues to be held every summer.

With a large number of computers at its disposal, the Columbus schools now can offer a high volume of training to teachers and administrators. District staff members, together with faculty from Ohio State University, can test computer-based programs, materials, and curriculums quickly and easily. As a result, the Columbus schools now have a software library with more than 3,500 titles—one of the largest collections of educational software in the country.

"We never could have brought computer technology into our schools as quickly or efficiently as we did without the help of Ohio State and the financial support of the business community," says Hyre. "Our school board and our staff knew the time was right, but our partners turned our goals into reality."

Once the first hectic but exciting Summer Tech program was over, the district began to tackle the need for a planned and orderly management system to cover all aspects of computers—from materials purchasing to school security.

"Just as any successful private-sector enterprise would do, we developed procedures to allow us to save money, meet staff and student needs, and remain up-to-date," says Assistant Superintendent Merriman. To pay for its equipment, the district relies on vocational funds, state lottery receipts, and grants from outside businesses and foundations. It consolidates requests from individual schools to take advantage of group purchasing. It uses an outside firm to maintain the equipment.

The school district keeps a grip on a problem any computer user faces—what to do with equipment when it becomes obsolete. "Every manager of technology has the same nightmare. Overnight, their present hardware becomes outdated and outdone by a new product that sells for half the price," says Merriman. But obsolescence doesn't worry Merriman, because he is willing to adapt older equipment to new uses. Rather than mothball or sell the Apple II+ microcomputers it bought in 1982, the school district now uses them in high school science laboratories: The machines serve as demonstration units and as monitors that measure temperature and pressure for science experiments.

Helping staff members overcome their fear of technology has been another challenge. With the assistance of people at Ohio State, some 2,500 school staff members now receive computer instruction each year. In addition, one teacher in each school acts as a computer specialist and helps other teachers with questions and problems. "Our job is to help show staff members that computers will enable them to do their jobs easier, faster, and in many cases, better," Merriman says. "Whether they're using computers as a classroom tool or for recording test scores or for scheduling substitutes, we have to help staff members see the benefits and be comfortable with the equipment."

Because the Columbus Public Schools are located in the 16th largest urban area in the U.S., computer companies have taken real notice of the school system's interest in computers. Merriman is working to make computer hardware and software manufacturers understand that schools represent a marketplace in and of themselves. "We have to get the providers of technology to understand what they can make specifically for education," he says. "Otherwise, we're put in the position of always having to adapt materials for our specific needs."

The district is working closely with major companies such as Apple and IBM and has become an important test site for these firms' equipment and software programs. "We are able to help these companies develop equipment and computer instruction techniques that school districts across the country will be able to use," Merriman explains. "More importantly, we can tell them what *won't* work in a classroom."

The Apple Corp. selected Columbus as one of seven sites for its Apple Classroom of Tomorrow project, a program that began last September. The computer company gave 30 ninth grade students at West High School (and their teachers) enough equipment so that each student and each teacher can have a Macintosh computer both at school and at home. Through Apple's efforts, the University of Waterloo donated two networks it had developed to connect the classroom system of computer terminals, printers, and other equipment. Apple and other companies donated software, which the teachers had to adapt to the school system's course of study.

The district chose four teachers, trained by specialists from Apple and Ohio State, for the Classroom of Tomorrow team. The teachers agreed to use an interdisciplinary approach to teaching English, mathematics, science, and social

studies. Students who applied for the program from middle schools agreed to take algebra or geometry and physical science for their mathematics and science credits. A lottery system was used to select an equitable number of male and female and black and white students. Other applicants were placed on a waiting list.

The program has focused, in part, on developing software for the Macintosh that increases the computer's use as an educational tool—not an easy task, because little software existed at first. "Teachers have had to be extremely creative as they develop lesson plans for their students. They have to create everything they are teaching daily—they don't have canned material to fall back on for a breather," explains Jane Pratt, supervisor of the school system's Department of Technology. "The creative process can be quite intense."

Although the program has not yet been evaluated, Pratt says she already sees educational benefits from this completely computerized approach to learning. "Attendance has been well above average," she says. "There is also far more peer instruction in the Apple classroom than in the traditional classroom. Each student can see all the other students' computer screens, and they help each other when they can. Because they are also working in an interdisciplinary environment, the teachers encourage them to enlarge their horizons and not to compartmentalize their learning into small subject areas."

Pratt admits the number of students logging on to the computer network has created some technical problems from time to time. But overall, she says, "We are very excited about the program."

The Columbus schools also are pioneering, as one of four field test sites, a computer and video literacy system from IBM for functionally illiterate adults, high school dropouts, and potential dropouts. Called PALS (Principle of the Alphabetic Learning System), the approach uses computers, word processors, and videodiscs to teach a phonics spelling system that "postpones the need to learn the rules and exceptions of English spelling and encourages writing," says Dorothy Merriman, PALS project coordinator.

Participants sit down at a terminal and a monitor. They see and hear a story—actually a fictionalized tale of the development of the alphabet—in full color on the video screen. Actors, whose voices are reproduced on the sound tracks of the videodiscs, narrate and dramatize the story. The second part of the program uses ten exercises, also on videodisc, that teach the reading and writing of words, sentences, paragraphs, and stories. Part three is a personal writing phase that includes dictation, reading, writing, editing, and the production of a resume that can be used in job applications.

By the end of the 20-week course, students have learned a variety of critical skills: how to read, write, type, and use a computer. "Students are excited about learning and using a word processor when they can barely read," Merriman says. "They say they have been denied access to computers because of their lack of reading skills. This program has given them a second chance."

The PALS program has two major advantages over traditional literacy efforts, contends Merriman: More students can be taught by one person—in contrast to a one-on-one tutorial setting—and the teacher becomes a program manager and student supporter who lets the computer handle the repetitious drill work. During a typical day, nine classes, with 16 students in each, can be taught. In one year, 288 participants can finish their training, and another 144 students can complete about half the course. One full-time teacher staffs the PALS laboratory during the regular school day and is responsible for the instruction, operation, and evaluation of the program. That teacher also trains and supervises substitutes and part-time evening teachers, who are paid by the hour. The computer and video hardware cost $50,000; annual operating costs come to $35,000 for teacher salaries and fringe benefits.

The program, which started last September, has not yet been evaluated formally, but early signs indicate it has real promise. "The program's capacity for helping solve the adult literacy problem still is not certain, but it's an outcome we hope will happen," Merriman says. "Hearing a participant say with great excitement, 'Listen, the sounds match the letters!' means, to an experienced teacher, that a big breakthrough just took place. Creating the magic of learning—that's what PALS has the promise to do."

In addition to its widespread use of computers, the Columbus schools also have a two-year-old program to help handicapped students learn to operate robotic arms and other devices that could help them live and work more effectively.

In a joint research project with Ohio State, staff members at Colerain Elementary School are teaching 125 physically handicapped students to use adapted computer keyboards, switches, and computer software to control robotic arms. They are also teaching students another necessary skill—how to envision, three-dimensionally, what they want the arm to do.

These robotic arms and other devices may one day give handicapped students a greater degree of personal independence and better access to jobs, the researchers say. The work at Colerain also might spur more interest in technology's potential for assisting the handicapped.

In the future, says Howard Merriman, technology will continue to keep its important place in educating students in the Columbus schools. "In 1983, parents wanted their children to know about computers, our staff wanted to learn about computers, and the workplace was demanding that our graduates be computer literate. As a public school system, we couldn't afford to deny our students the competitive edge computer knowledge provides," he says. "This same philosophy will take us into the future. Computers are now one of the basics in the Columbus schools."

For more information, contact Howard Merriman, Assistant Superintendent, Columbus Public Schools, 270 E. State St., Columbus, Ohio 43215; 614/225-2706.

Resolute leadership erases resistance to technology

Mahopac, N.Y.

Extensive in-service training and realistic financing make the latest computer technology so familiar in the schools that even the bosses like using it now

It is just another public meeting: business as usual. School board members and parents are sitting at computer keyboards, trying out a new elementary school computer writing program the Mahopac (New York) Central School District recently has introduced. They chat with school staff members and see samples of stories children have written on the computer. No parents seem amazed or intimidated by the sophisticated computer equipment. Nobody asks, "Why are you spending our tax money this way?"

"In 1987, the computer technology program in Mahopac seems so logical and such a natural part of the total educational program that I can't imagine our schools without computers," says Superintendent Jerry Cicchelli. "I can't imagine a new curriculum area not using computers as an instructional tool."

This small New York State school district, which enrolls 4,000 students K-12, has 400 computers, one for every 10 students, and a wide range of programs for every grade level. It also has converted its libraries into state-of-the-art technology centers. Students in both elementary and secondary schools use the libraries' computer laboratories for everything from learning reading and mathematics to taking college-level advanced computer courses.

But, as Superintendent Cicchelli is quick to point out, it wasn't always that way. Only eight years ago, the school district had no computer technology program, and establishing one seemed risky, controversial, and expensive. In 1979, however, Cicchelli and the school board became convinced that the computer had great potential value for educating children more effectively. They got little support from either the teaching staff or the community, but, "We took the lead. We played very assertive roles in starting the program and clearly and repeatedly told the community that we felt technology had an important role to play in our education program," Cicchelli

After in-service computer training, a Mahopac (New York) teacher helps a student with a tricky problem in the schools' library-turned-technology center.

recalls. "The die was cast."

Early on, he says, the board knew the introduction of computer technology would increase costs, at least at first. Over the long run, though, "We expected to get more education from fewer tax dollars, because computer instruction can be very cost effective and more learning can take place in less time," he adds. The board budgeted $20,000 to get things started and agreed to acquire equipment and software systematically. Now, the board budgets $250,000 a year for computer technology. "This financial commitment reinforced the board's determination to implement the use of technology across the grades," Cicchelli explains.

The board and superintendent also agreed that worthwhile recommendations from staff members never would be rejected for lack of money. That attitude did not mean unlimited funds were available for technology, but it did mean the district would fund substantive instructional recommendations. The next step, then, was to win the support of teachers. "There was a reluctance among the professional staff to apply technology in the classroom," Cicchelli says. "After all, how many new approaches have been tried and abandoned in the last 50 years in American public education? Teachers and principals expressed their skepticism on the true value of this new 'fad.' Many thought that this, too, would pass."

But it didn't. The board and superintendent established a major staff development program to train teachers in curriculum-specific uses of computers. Every elementary school teacher received a mandatory ten hours of teacher-led training during school time and at district expense. Beyond that, the same computer each teacher used during training became the first computer he used in his classroom. The district sent teachers back to their classrooms to use their skills immediately; there was little downtime between training and classroom application.

In secondary schools, where computer laboratories are used more extensively, teachers came in by departments for training during their regular workdays and went to use the laboratories shortly after their training sessions. In all cases, the trainer made follow-up visits to classrooms.

That method of handling staff development meant extensive use of substitute teachers, Cicchelli explains. More important, it required a good trainer to be on staff. "We were lucky," he says, "to have a staff member on hand who had exceptional enthusiasm, knowledge, and skill."

In fact, Mahopac's staff development program was so good it became the subject of a half-hour television program, "Staff Development in Technology," written and produced by the state education department's Center for Learning Technologies. The program, broadcast on public television stations across New York State, described how the district's training program had contributed to the overall success of its computer technology program. The television show also gave the Mahopac community a close look at the way the district's technology program developed into one of the premier technology programs in the state.

With the teachers trained, students began using the new equipment. And from the start, they were enthusiastic. As the students' positive responses became more overt and noticeable, the impetus for program expansion shifted from the central administration to teachers and parents, Cicchelli recalls. "It became easier to sell the program, which resulted in more ambitious and innovative uses of computers. By now, the school community has bought the program," he says.

As computers and their uses increased, the superintendent and board kept their goals clearly in mind: They were interested in computer technology only when it enhanced the district's curriculum. The curriculum determined the use of the computer, and not the other way around. "Since we knew what we wanted to accomplish, we could easily establish administrative practices for continued staff development, the purchasing of equipment and software, and the expansion of our programs," Cicchelli explains.

Mahopac's latest venture has been the conversion of its libraries into state-of-the-art technology centers. At Mahopac High School, four computer laboratories—with everything from interactive video to an electronic bibliographic retrieval system—help students in various subject areas. Two of the high school laboratories use a local area computer network to connect to the main computer—a system that lets each student "enjoy the freedom and independence of the microcomputer" as well as the advantages of a linked system, says Amy Botto, director of computer education. Any teacher has a software library available to students on the computer network, and the teacher can control each student's access to the software. A teacher can individualize student lessons and generate reports on the quality and quantity of a student's work.

Two other laboratories in the high school give students the option of studying a computer language such as Basic or Pascal. Some students also take an advanced computer course, offered by Syracuse University, for college credit. In addition to the high school's four laboratories, it also has stand-alone computers in special education classrooms; they are used for programming, writing drill and practice, and remediation. The science rooms, too, have computers, which students use for experiments and data analysis; teachers use them for preparing objective examinations and writing personalized student progress reports.

The library at Mahopac Junior High School also has become "a dynamic learning center," says Assistant Superintendent Edgar L. Richards. "Students in the junior high were already using computer technology in science and social studies courses and in remedial reading and mathematics. We knew that technology gave us useful tools to enhance learning, and we also knew that the print medium alone could not give us the instructional outcomes required of today's schools," he explains. Those convictions, coupled with a "general disappointment" with the limited previous use of the library by junior

high school students, led to changes. The school's Learning Technology Center opened in 1984.

It features six stations that are adapted to different learning tasks. At the first station, for instance, software for all curriculum areas and 28 network-linked computers are available. But the main attraction is E.T.C. (for English, Technology, and Communications), a course developed by nine English teachers to teach all seventh grade students how to use word processing software to write "clear, cogent prose," he says.

Science and social studies classes meet at the second station at least once every ten class days for computer-assisted instruction. Students at both the stations also can schedule themselves for independent programming and review sessions during lunch periods and after school.

Other stations help students gain other skills: Those who fail to meet certain academic requirements can do remedial work, for instance. One station houses the library's print collection, 18,000 books, and 54 periodicals rearranged to occupy only one-third of the space they needed before. Another allows students to use an electronic bibliographic retrieval service to assist them in library research.

The success of the junior high school's Learning Technology Center was "astonishing," Richards says. As a result, the district in 1986 transformed three elementary school libraries into technology centers, each with 32 network-linked computers and 15,000 volumes that help hundreds of children each day in a wide range of educational programs. Each elementary school contains two technology stations, one for mathematics classes and one for writing. Each classroom also contains at least two microcomputers.

Before the technology centers were opened, teachers received at least two half-day training sessions in the theory and use of technology, Richards says. "Teachers were free to request additional training. The success of the elementary school centers is so evident that the district is looking to expand services in these areas next year."

As for the future, the district continues to be excited by the uses of technology. "We've established support and acceptance from parents, teachers, and students along with professional recognition from outside the school district," notes Superintendent Cicchelli. "We've exchanged the pains, insecurities, and joys of the past for the promise and challenge of the future. We plan to shape what's next."

For more information, contact Jerry J. Cicchelli, Superintendent, Mahopac Central School District, Lakeview Drive, Mahopac, N.Y. 10541; 914/628-3415.

Glenview, Ill.

Electronic data transmission is beating that bane of school life—endless reports

Even in this high-tech age, paperwork still is the bane of your existence. The state wants forms, the federal government wants forms, and you have to supply the same information over and over again. But the Glenview (Illinois) Public Schools can offer a ray of hope: Their "showcase for data transmission" can reduce the time, effort, and duplication involved in paperwork.

The Glenview schools, with the aid of AT&T, are using the latest technology to transfer data electronically from a local school to the state education department. The plan is to have the school or school district supply the data requested by the state only once. Then, when the information is needed again, the state can go to the computer where the information is stored. The state department also will have direct access to the local data when it wishes to update its enrollment, budget, or other figures.

To implement the program, AT&T computers and three terminals were installed in each of Glenview's six elementary schools for the principal (and secretary), the teachers' workroom, and the library. At the junior high level, the principal and other administrators use a computer with ten terminals. And at the district level, a computer with 18 terminals makes it easy for the superintendent, business manager, supervisor of buildings and grounds, and others to supply information.

That configuration allows the school district to transmit data electronically and to communicate with any part of the system. The computers store a wide variety of essential information: student and personnel records, warehouse inventories, attendance and payroll records, and so on.

The data then go to the North Cook Educational Service Center, an intermediary agency for 39 school districts in suburban Cook County. There, the director uses a large computer with eight terminals to compile the data from the Glenview schools and transmit it to the state.

For the moment, there's the rub: AT&T staff members are still working with representatives of the Illinois State Board of Education to complete the final step. They have to work out the appropriate

Our Latest Repo

Moms and Dads are tickled pink.

In Chicago, they're celebrating what PRINCIPAL magazine called "a remarkable turnaround."

In Albany, Oregon, parents also think "remarkable" describes the results of one school's first year on WICAT Systems courseware.

Just consider the numbers. At Periwinkle Elementary in Albany, first and second grade CTBS math scores have soared 29%. Fourth and fifth graders have improved 9%. And the third and fourth graders have scored an impressive 15% gain—all after just a year on WICAT courseware.

Meanwhile in Chicago's inner city, many Zenos Colman students have experienced an about-face using the WICAT system for a full year.

On ITBS reading, both the fourth and sixth grades showed gains that were nearly three times higher than they had previously averaged when only traditional instruction was used. Third graders nearly doubled their average gains.

However, second graders did the best of all, with average gains nearly four times higher than their previous performances.

What's more, Colman principal Harry Donahoo also has observed a huge shift in his students' attitude.

"Discipline problems are virtually nonexistent in the computer lab," he tells us. "Children at all levels are on task during the entire 30 minutes in the laboratory."

"The improvement has been dramatic. Since these gains have been achieved by every class which used the computer lab, the WICAT educational system had to be the major difference."

Aimee Larsen of Albany, Oregon's Periwinkle Elementary, where CTBS scores have increased as much as 29%.

Rafael Jordan of Chicago's Zenos Colman School, part of what PRINCIPAL magazine called "a remarkable turnaround."

More Than Courseware, It's A True Curriculum

So what's the major difference in WICAT professional learning systems? One is that WICAT courseware makes up a true curriculum, created by professional educators to follow a sequence consistent with the leading texts.

And the curricula is comprehensive, both in terms of subject matter and in-depth coverage. And as Stillwater, Oklahoma's computer specialist Ann Henson discovered, you can't say that about everyone.

"There isn't enough courseware available for the micros. It's gone in three months," she reported. "But we don't have

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rt Cards Are Out.

Lan Ly of Stillwater, Oklahoma, where students have found courseware "that they can't exhaust," according to their computer specialist.

to worry about kids running out of courseware with WICAT.

And while each student receives individualized lessons, the teacher receives detailed reports on performance that pinpoint the student's strengths and weaknesses. These reports, plus unique tests for measuring student's progress against objectives, allow the teacher to offer one-to-one attention right where each student needs it.

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In a world of computers made for businesses the WICAT professional learning system was designed by educators, for educators.

Not surprisingly, the millions of dollars and years of research in developing this professional learning system were spent on quality rather than on compromises.

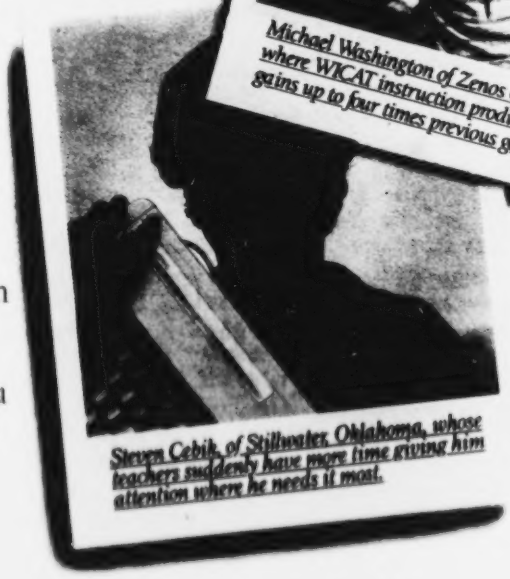
That means you get a full curriculum designed to support specific educational objectives, instead of a collection of lessons that students can finish quicker than they finish lunch.

It means you get 64 students working on 64 different lessons simultaneously, going beyond drill and practice and developing true higher order thinking skills.

It means you get reports that let teachers spend less time grading papers, and more time teaching students. And it means you get the most extensive testing capability available: you can test students' Basic Skills Competencies in the morning, and have the results with prescriptions into our courseware by afternoon.

In short, you get quality without compromise. And you get kids to smile without having to say "cheese" first.

Michael Washington of Zenos Colman School, where WICAT instruction produced reading gains up to four times previous gains.



Steven Cebik of Stillwater, Oklahoma, whose teachers suddenly have more time giving him attention where he needs it most.

To learn more about the thinking behind our professional learning system, write or call WICAT Systems, 1875 So. State, Orem, UT 84058, (800) 453-1145 (ext 209) or (801) 224-6400.

We think you'll be just as impressed with the thought we put into this system. After all, no one does this well in schools unless they've really done their homework.

WICATsystems

transmission channels to get the data to the correct state office and to allow the state to communicate with the local district. The initial work probably will be completed this year, but Superintendent William Attea says more extensive communication channels will take another school year to complete. Start-up costs to the district have been $30,000 so far.

"Our intent is to set up a model that can be used by school districts in Illinois and elsewhere to replace the traditional way we send data through a variety of forms," says Superintendent Attea.

The Glenview schools also participate in Micro-Ideas, the computer arm of the county's educational service center. This consortium provides a variety of services to its members: a software lending library with 2,000 programs; workshops that deal not only with computers but with videodisc and satellite communications; seminars on specific advanced topics; and an annual conference on the use of computers in all subject areas. It also provides help with computer hardware and software needs and gives staff members from the participating districts a chance to get hands-on experience with equipment supplied by different companies. The consortium receives its operating money both from the state and from fees paid by the districts it serves.

"As Micro-Ideas looks to the future, we want to help the districts we serve become aware of emerging trends in technology and use new technology to enhance our schools and our children," says Lee Siudzinski, director of the North Cook Educational Service Center. "We don't look at technology as an end in itself but as a vehicle to strengthen all instructional areas, individualize programs, and serve special needs."

For more information, contact William J. Attea, Superintendent, Glenview Public Schools, 1401 Greenwood Road, Glenview, Ill. 60025; 312/998-5000.

Montgomery County, Md.

Students use media technology to expand and enrich their course work

In Montgomery County, Md., when you're tired of the soaps and shoot-'em-ups on commercial television, you can turn to Cable Channel 26, the channel run by the county's public school system. Begun with an $850,000 grant from the company that originally won the county's cable franchise, Channel 26 broadcasts eight hours a day.

The Montgomery County School District is not the first school system with its own television operation, but it was determined to be "different," says Television Program Specialist Harry A. Swope. Many school-run cable channels use educational films to fill time, but in Montgomery County, more than half the programming is locally produced for, by, and about students and citizens, Swope says. Even films used as filler need the approval of curriculum specialists and must be directly tied to classroom studies.

The channel's operating staff includes both educational and television professionals. Experienced producer-directors and technicians provide technical support for production and operations; student interns, often trained in television production since elementary school, help out. The result: programs that serve specific needs, no matter how small the potential audience. Televised homework hotlines help students with homework problems; specials feature students who have won awards; a weekly series serves parents of the hearing-impaired.

Soon, Swope predicts, the cable channel will cross the frontier of high technology, with interactive programming for both students and staff. More than a dozen high schools soon will be linked to a closed-circuit institutional network that will permit at least six channels of two-way video and audio to operate. "We are only now scratching the surface of what cable technology will eventually mean to the schoolchildren and adults of Montgomery County," he says.

In addition to cable, the schools have a number of other programs that use technology effectively. A

computerized central data bank, called the Connection Resource Bank, helps mathematics and science teachers by bringing the expertise of the community and the business world into their classrooms. Located near Washington, D.C., the county's schools have access to people and programs in places such as the Smithsonian Institution, the National Institutes of Health, and other research facilities.

The data bank, sponsored by a nonprofit foundation established to increase the schools' resources, lists 850 businesses and individuals teachers can contact. Through a telephone call to the computer bank's operator, a teacher can find information about appropriate experts, programs, field trips, equipment, scholarships, internships, awards, and conferences. Once the contact has been made and the availability of the speaker confirmed, the teacher contacts the person or organization directly. Ultimately, the school district wants to have a computer at every school to help teachers gain direct access to the data bank.

The school district also uses a variety of state-of-the-art technologies in programs for gifted and talented students. One intermediate school, for example, has a magnet humanities program that uses computers, laser printers, and video technology to "increase the accuracy, speed, style, and creativity of the communications process," says teacher Virginia A. Tucker. Seventh and eighth grade students in the gifted and talented program take a core curriculum in literature, social studies, science, music, and art. They also choose from specialized course offerings in three areas: writing, media production, and foreign languages.

"The curriculum gives the students complex concepts, ideas of substance, and real problems to overcome," Tucker explains. "Computers and media technology provide students with the tools to analyze, evaluate, and create their responses to those ideas." One example: In social studies, students interviewed the master stone carver at Washington, D.C.'s, National Cathedral, which they use as a museum for studying the arts and crafts of the Middle Ages and for "understanding the importance of the apprenticeship process in preserving artistic skill," she says. A video crew from the media production class recorded the interview and produced a documentary videotape so others could benefit from the information. Students in the school, which has a color television studio and a radio station, also produced a radio program, broadcast in Spanish, for the local Hispanic community.

One high school has a special magnet program for 400 gifted and talented students in mathematics, science, and computer science. Students spend about half their day in a specially designed sequence of courses that emphasizes independent thinking and interdisciplinary learning. The program gives students opportunities "not normally available in high schools," says coordinator Michael R. Haney.

For more information, contact Harry A. Swope, Television Program Specialist, or Beverly J. Sangston, Director of Computer-related Instruction, Montgomery County Public Schools, 850 Hungerford Drive, Rockville, Md. 20850; 301/279-3141 or 301/279-3321.

Fairfax County, Va.

Computers lend handicapped kids the latest in helping hands

One young student, physically handicapped and confined to a wheelchair, cannot use his hands. But in the Fairfax County (Virginia) Public Schools, he can use his knee to operate a special control that lets him use a computer to help him do his schoolwork.

The Fairfax County schools are using the latest technology to help a significant part of the school population—14,000 children who have handicapping conditions. This fall, the school system expects to open a new Special Education Technology Resource Center that will assess the needs of handicapped children and make available whatever useful devices technology can provide to meet those needs.

"It's our goal to use technology in all instructional applications

where it can have a positive impact on the education of handicapped children," says Linda R. White, instructional technology specialist for the Department of Student Services and Special Education. "We believe in the power of modern technology and what it can do for these children."

The schools have asked for $200,000 from the Fairfax County Public Schools Educational Foundation, a nonprofit group that has pledged to raise the money from businesses and other sources. So far, White says, about $95,000 has come in. The money is being used to buy the various devices that will help students, including special switches, adapted keyboards, and other specially designed computer hardware and software. Some devices help nonverbal students communicate. Some of the aids work with a computer, but others can stand alone, she says. Handicapped students can use laptop or hand-held devices to print out results of their work in the classroom.

"No one device will work. We need a variety to meet the special needs of handicapped students," she explains. "We want to be able to buy items in duplicate. We can keep one of each device at the Resource Center and have additional equipment for students to use in the classroom."

Handicapped students who come to the center will be evaluated by a team of specialists in education, instructional technology, and physical and occupational therapy. The team will make certain that a student's needs in all instructional areas are understood and that appropriate technology is selected to help the student. Right now, the school system uses computer-assisted instruction in its educational program for handicapped children, and the "computer is continuing to make a difference," White notes. "Writing is a major emphasis in the curriculum, and the computer has given students opportunities to improve the quality and the quantity of their writing."

The center also will use technology to help handicapped students in career training, communication assistance, and environmental control—turning lights and radios on and off, for example. "They often need help to do things that we take for granted," White points out.

In addition to working with handicapped students, the Fairfax County schools also are applying technology in a variety of other education areas. Since 1984, the school system has been operating Red Apple 21, a public affairs cable television channel. The channel started with a 24-hour electronic bulletin board for school-related messages. Now it does some original programming: *Profile* presents a portrait of an individual school; *The Parent Connection* offers practical suggestions for parents who want to take a more active role in their children's education; and *Students' Corner* features high school students as they share their concerns and talents with the community.

Recently, the school board voted to air its budget meetings on the cable channel, and a plan to broadcast all school board meetings on television now is under consideration.

Other long-range goals include expanded coverage of exemplary school activities, more emphasis on discussions of educational goals, more on-the-spot coverage of school events, and additional opportunities for students' creative expression, says cable programmer Elsa Norris.

The school system also is giving high school students a "realistic grasp of economics" through a computer-based course in applied economics, says Don Nichols, social studies curriculum specialist. During the course, students form their own company and learn economic principles by operating the company, investing its dividends, and reporting to its stockholders. Students use computers to store company information and prepare reports. Later, they play computer-assisted management games, based on economic principles. Students like the course, Nichols says. In a survey, 76 percent of students who responded said that applied economics was "better than the other classes I have had in the past year."

For more information, contact Linda R. White, Instructional Technology Specialist, Department

of Student Services and Special Education, Fairfax County Public Schools, Belle Willard

Administrative Center, 10310 Layton Hall Drive, Fairfax, Va. 22030; 703/691-2186.

Central Kitsap, Wash.

This computer network turns a management nightmare into a teacher's dream

It's an educator's dream: Children walk into the classroom, eager to work. Their teacher knows exactly what progress each student made in the last class and chooses the next appropriate lesson. The instruction uses sight, sound, and touch. At the end of the class, students sigh with disappointment because the lesson is over.

In the Central Kitsap (Washington) School District, that scenario is not a dream. Rather, the scene is repeated nine times a day in the computer-assisted instruction laboratory at Woodlands Elementary School. The laboratory has 30 computers, linked in a network to a central computer that retains student records and the basic reading and mathematics curriculums for grades K-6. Teachers can match some 1,500 lessons to a student's ability and progress. The district's junior high school also contains a computer-assisted instruction laboratory.

At Woodlands, students spend 25 minutes every other day in the laboratory. "While 25 minutes on alternate days seems insignificant, virtually no students in regular teaching situations receive more than an hour a week in highly individualized, self-paced basic skills instruction," says Superintendent Eugene R. Hertzke. "If we were to attempt such instruction without using technology, we'd need to hire more than 18 additional teachers for our 550-student elementary school." Even then, he adds, tracking student performance without a computer would be a management "nightmare."

The technology has other benefits, he maintains. Because each student has his own computer and uses a headset and microphone, he can work without distraction. Teachers have noticed that students concentrate more on their work, not only in the laboratory but in the regular classroom as well. Another benefit: improved problem-solving skills. The software package emphasizes thinking skills, and students are led through problems systematically, learning step-by-step approaches to finding solutions. Teachers report that these improved problem-solving abilities also carry over to other work, he says.

Teachers also benefit from the technology: They get printouts of each student's progress, rate of success, and level of achievement. That information lets teachers design specific exercises that help students master the objectives. The laboratory also has made reduced teacher-pupil ratios possible. By assigning half the students to the laboratory, for instance, the teacher can conduct small group instruction.

Last summer, the school district also began to experiment with interactive video, which integrates computers with laserdisc players and other video equipment so that students can see, hear, and respond to a multimedia lesson. The advanced technology didn't scare his small school district, Hertzke says. "We're in a community that includes several high-tech Navy facilities, so our citizens are comfortable with technology."

The elementary schools will use the new technology in earth science classes, to allow students to see animated volcanic action or the movements of continental plates. The laserdisc technology will allow students at the high school level to have opportunities for research in such advanced computer subjects as artificial intelligence and expert systems. And library and teaching staff members will use their laserdisc unit to create lessons that are not dependent on a textbook and that can be modified to suit any student's ability, staff members say.

"We think the potential for outstanding results with laser technology is limitless," says librarian Barbara Raupach. "But [laser technology] has some problems: availability, the sensitivity of moving this equipment, and the downtime that seems beyond our technical abilities to remedy or even

diagnose. If other districts are seriously considering incorporating laser technology into their curriculum, they should plan on time for learning the intricacies of the hardware, for mastering the techniques needed to design programs, and for developing their projects."

For more information, contact Eugene R. Hertzke, Superintendent, Central Kitsap School District, P.O. Box 8, Silverdale, Wash. 98383; 206/692-3100.

Indian Springs, Ill.

Here's what might be the ultimate in computer management systems

A 2,300-student school district near Chicago is pioneering the ultimate computer telecommunications system—and it could be a model for school systems across North America.

In Indian Springs (Illinois) School District 109, Superintendent Arvid Nelson has created a computer network that electronically connects his office with all the teachers, administrators, and other staff members in his elementary school district. The network's purposes: to provide an instantaneous exchange of information among school staff members; to free teachers from some record keeping; and to make computers an integral part of teaching and management.

When Nelson arrived at Indian Springs in 1978, he immediately put into action a computing system that simplified the school registration process parents and staff members faced each fall. With that success behind him, he applied for, and received, an $85,000 grant from the Illinois State Board of Education.

The money enabled Nelson to begin the first phase of his computer networking project, called CAMS (Computer Assisted Management Systems). The district installed data entry systems in every elementary school; they are connected to the mainframe computer in the central office.

The school district then developed a sophisticated data base for a variety of school topics—budget and finance, student and personnel records, and instructional management records. Now, there is almost no list that cannot be found within the system—from class rosters to discipline records to student dental records to bus seat assignments. As a safety measure, crossing guards have computer lists of students who use specific routes. Nelson saw to it that all secretaries, administrators, and nurses, as well as some teachers, learned how to enter and gain access to information.

In 1983, the IBM Corp. selected District 109 to be one of 30 teacher-training centers for the company. The district's staff, together with staff members from nearby colleges and universities, started to offer courses on the use of computers in education. The district still maintains a close relationship with IBM. Now, it has a contract with the company to demonstrate through seminars and workshops how computer work stations will assist teachers, students, and administrators. It also has established a library training center that demonstrates educational software compatible with the IBM personal computer. For its part, the company provided 54 microcomputers for the district's computer network.

In 1984, Indian Springs, already in the forefront of computer technology, received $80,000 from the U.S. Department of Education. Nelson used that money for the next phase of his networking system—CANS (Computer Assisted Network Systems)—adding all teachers in the district to the electronic network. To date, the district has installed 130 microcomputers, one in each regular classroom, full-day kindergarten, administrative office, and special education classroom. The computers all are to be connected to the district's central computer. All teachers have received computer training, Nelson says.

With this system, each teacher can gain access to the district's mainframe computer and easily can take care of the many administrative tasks that require teacher time and energy. When the record-keeping tasks are done, the computer is right there in the classroom, ready for a variety of instructional uses. Nelson says computers eventually will free up nearly half of the

teachers' time by reducing paperwork.

As a result, teachers will have more time to spend on instruction. The electronic link between the teacher, the principal, and the central office also will make a more effective learning program possible for each student, Nelson argues. "Where we have failed in education is our inability to diagnose and assess the learning program of a child, particularly in the basic skill areas," he says.

"With the implementation of this system, we will be capable of evaluating the learning program of each child electronically. Teachers, with the help of the computer, will assist us in the diagnosis (where the child is) and assessment (what the child has learned). Then we can move that child to the next step with some degree of accuracy," he explains. "The computer never will replace teachers. It will just lighten their load."

For more information, contact Arvid E. Nelson, Superintendent, Indian Springs School District 109, 80th St. and 82nd Ave., Justice, Ill. 60458; 312/496-8700.

Charlotte-Mecklenburg, N.C.

From game shows to teacher recruiting, this media program scores a big hit

In Charlotte, N.C., *Wheel of Fortune* and *Hollywood Squares* aren't the only television game shows in town. The Charlotte-Mecklenburg schools have one, too: *TV Challenge*, a game that makes world history fun.

"Because young people are turned on to television and to game shows, why not use both to educational advantage?" argues Opal H. Miller, media specialist at Harding High School, which began the show three years ago. "The competition motivates learning."

After high school students complete a unit or two of classroom study, they are organized into competing teams that attempt to answer a variety of questions on world history. The school's television studio broadcasts the show—complete with a master of ceremonies, a judge, a scorekeeper, and a timekeeper—live on one of two campus closed-circuit television channels. The show also is recorded for later use. Students in other classrooms can hear the show on shortwave radio or intercom sets. The result has been so good that "some students continue to participate in the television show even when they are no longer in the world history class," Miller says.

In addition to *TV Challenge*, the 73,000-student school district uses media technology in a host of instructional areas. The district invested more than $250,000 in equipment and facilities to set up a major audiovisual production center that creates television programs, filmstrips, and slide presentations that use sound. The idea behind the Villa Heights Center was to produce "top quality programs at reduced cost—about a third of what privately owned production companies would charge," explains producer Donald J. Hambridge.

The center, staffed by three professionals, produces between 35 and 40 programs a year for students and staff members. A series on *Chronic Illness in the Classroom*, for example, helps teachers deal with students with special needs. *Taking the Lead*, a videotape designed to promote the school system and recruit new teachers, also has been used by the Charlotte Chamber of Commerce to entice companies to relocate to the area, Hambridge says. The local public television station broadcasts many of the center's programs as part of its instructional television schedule.

East Mecklenburg High School has a library/media center that includes, among other things, a three-channel closed-circuit television system and video-editing equipment. Televisions are stationed in every classroom and in administrative offices. The school has a television production curriculum that teaches students to write and produce their own programs, including a morning news show and live interviews with local authors and business leaders. Students also produce *Meet the Candidates*, a show that gives government students a chance to interview candidates who are running for local public offices.

Besides these planned productions, the high school has a number of video portapaks—video

cameras and videocassette players that circulate from classroom to classroom. Students and teachers use the equipment to tape class presentations, show science experiments, or practice interviewing skills for jobs.

The media center also contains two laserdisc players to give students information about various colleges; fully equipped graphics and photography laboratories; and a computer that is used to teach music theory.

The district has not neglected computers in other areas, either: It has computer laboratories in all its 103 schools; these machines are used for a variety of educational purposes.

For the elementary school social studies program, for instance, three classroom teachers have created data bases to help all students in grades four through six learn both geography and computer literacy at the same time. Students can search the data bases for information on agriculture, climate, industries, or languages for countries in Latin America and Europe as well as for counties in North Carolina. A teacher or student can update the data base or create a new one when the curriculum calls for it.

For more information, contact Wayne Shumate, Technology Coordinator, Media and Technology Services, Charlotte-Mecklenburg Schools, 800 Everett Place, Charlotte, N.C. 28205; 704/331-9083.

Arlington, Texas

Interactive video cuts ambitious science experiments down to classroom size

The tiny world of molecular structure and the hazardous world of chemical reactions—these topics are becoming crystal clear to students in a new technology-based physical science course in the Arlington (Texas) Independent School District.

The physical science project uses interactive video—an integrated system of computers and audio and video equipment to present a multimedia lesson. That approach will improve instruction and increase student interest in science, says Superintendent Donald Wright. "It's a great way to pique the interest of students and maintain it with the aid of technology."

Instead of simply listening to lectures or watching films, for instance, the 300 junior high school students participating in the project can see the workings of science firsthand on a computer with a graphics monitor.

"The program lets me do some things in the classroom that were previously impossible or too dangerous," says teacher Steve Hoffner. "With this program, my students and I can do experiments with radioactive materials and explosives right on the computer."

The physical science curriculum is a project of the Texas Learning Technology Group, a partnership between the Texas Association of School Boards, 12 Texas school districts, and the area's National Science Center Foundation. Teachers and administrators from the participating districts, scientists from universities and industry, and the Texas Learning Technology Group's staff developed the curriculum.

The two-semester course includes 160 hours of instruction, with one introductory unit, eight units of chemistry, and eight units of physics. Students do their laboratory work either in the school's laboratory or on the computer, using simulated laboratory situations.

A popular feature of the project is its classroom-management system, a computer software package that reduces the paperwork involved in grading and reporting. The computer system has a grade book that uses a scanning device to grade tests and to record students' scores.

The project is a "fascinating use of technology," says Wright, who also is a member of the Texas Learning Technology Group's board of directors. "It allows students and teachers to do things not possible through books and other available materials."

For more information, contact Rosemary Travis, Public Information Officer, Nichols Junior High, Arlington Independent School District, 1203 W. Pioneer Parkway, Arlington, Texas 76013; 817/460-4611.

Count the ways technology can improve your schools

A computer telephoning parents? Students building computers from kits? School districts nationwide have hit upon these and an impressive array of other innovative ways to improve education through the use of technology.

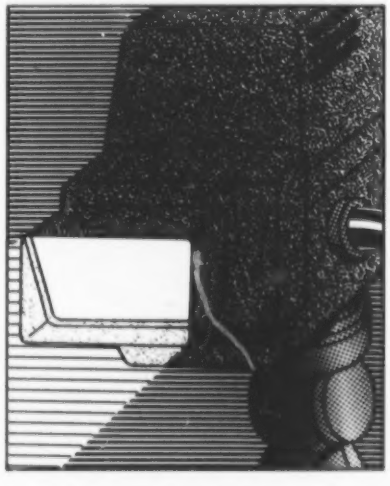
Here are 29 school districts whose technology programs, briefly noted, might give you ideas you can use in your own schools:

Computerized evaluation

School board members in one Michigan district are using a computerized evaluation system to help them govern more effectively. The board and superintendent in the Genesee Intermediate School District designed their own assessment system two years ago. Now, board members rate themselves in 11 areas, from policy development to community relations. The computer program summarizes board members' self-evaluations as well as their ratings of the board as a whole. Results: "A clear improvement in boardsmanship and in the team management concept," says Superintendent David E. Spathelf. ***For more information, contact Information Processing and Human Services Dept., Genesee Intermediate School District, 2413 W. Maple Ave., Flint, Mich. 48507; 313/768-4430.***

Optical scanner

Want a piece of technological equipment that makes a big impact with little staff training and low start-up costs? It's the optical scanner. The Millard Public Schools in Omaha have used scanners (or optical mark readers) since 1981 for numerous school tasks, from scoring reading and mathematics tests to tabulating ballots for class officers. The scanners can stand alone or be connected to desktop personal computers or mainframe computers. Their advantages: They give students immediate feedback on tests and save teacher, clerical, and



administrative time. ***For more information, contact Charles A. Speiker, Director of Planning and Evaluation, Millard Public Schools, 1010 S. 144th St., Omaha 68154; 402/895-8216.***

Video press release

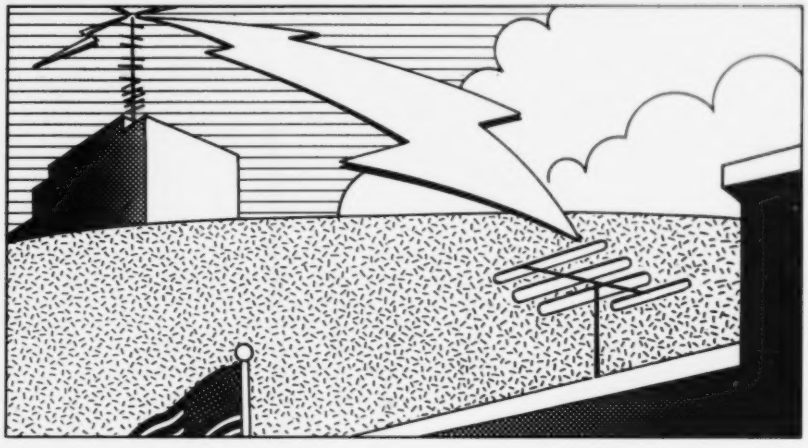
If you want to show people in your community all the good things your schools are doing, trade in your standard press release for a videotape. Using a new video editing system, the library/media department of the Ferguson-Florissant School District in Missouri has created a videotape of school district programs that has been shown on cable television and at parent meetings. Now the school system is producing new tapes on its early education and other specific programs. ***For more information, contact Robert Manges, Educational Technology Coordinator, Ferguson-Florissant School District, 1005 Waterford, Florissant, Mo. 63033; 314/831-4411.***

Teacher retraining

When enrollments drop, experienced fine arts or home economics teachers might find themselves out of luck and out of work: The district no longer can afford them. But teachers in these low-demand areas are being retrained in computer education in the Phoenix Union High School in Arizona. Elementary and secondary teachers who faced layoffs took courses in computer literacy and programming at a nearby university. They either received a grant or paid their own way. The retraining program, developed by the school district and the university, got results: Those who completed the courses found work in their own district or became full-time computer education teachers elsewhere. ***For more information, contact Richard N. Sheets, Coordinator of Computer Education, Phoenix Union High School District, 2526 W. Osborn Road, Phoenix 85017; 602/271-3160.***

Interactive television

Several districts are using technology to improve education for rural, geographically isolated students. In Michigan, two districts are increasing course offerings to schools with small enrollments through two-way interactive television. With help from the state and from a consortium to which the schools belong, the Cheboygan and Mackinaw City districts connected their classrooms to an already-existing television cable. Now,



schools in each district send classes in foreign languages or media electronics to each other. The teacher and students in both locations can see and hear each other; classrooms have telephones for student questions; and students in the remote school send in their homework by mail. Plans are under way to expand the courses to other districts in the Michigan consortium. ***For more information, contact James H. Laidler, Superintendent, Cheboygan Area Schools, 520 N. Main, P.O. Box 100, Cheboygan, Mich. 49721; 616/627-2321.***

Broadcast instruction

A Virginia school system is using an electronic classroom with one-way video and two-way audio to provide courses to outlying high schools. The classroom, based in a high school in the Henrico County Public Schools, allows students at remote sites to see the teacher and call in questions about the subject matter. The questions are projected so that students at all sites can hear them. The courses, produced in a studio, are transmitted through a microwave signal that is broadcast to the local educational television station and then switched electronically to open broadcast to schools. The state and the Henrico schools paid the major $250,000 start-up costs; participating districts pay a per-pupil fee to help defray ongoing costs. ***For more information, contact Ida J. Hill, Director of Technology, Henrico County Public Schools, P.O. Box 40, Highland Springs, Va. 23075; 804/737-3956.***

Instructional television

Affordable instructional television programs are reaching 42 rural school districts in southeast Kansas. A television station in Kansas City, Mo., agreed to make master videotapes available for school use. The station ships them to an instructional media center, which serves as a duplicating and dissemination site for southeast Kansas schools. The center also helps the schools purchase and maintain video recorders. Teachers evaluate each instructional television program, and each year, representatives of all the school districts vote on programs to be dropped or added. ***For more information, contact Wilda Pentola, Instructional Media Center Director, Southeast Kansas Education Service Center, Route 4, Box 176, Girard, Kan. 66743; 316/724-6285.***

Devices for the handicapped

The Olathe (Kansas) public schools are using computers with adapted keyboards and a variety of other devices to help students with multiple handicaps. The district established a technology resource education center last year to find ways to help handicapped students improve their motor, communication, and cognitive skills through specialized technology. The center also assesses students and develops training programs for staff members to meet the special needs of children. ***For more information, contact Ron Wimmer, Assistant Superintendent, or Mary Hupka, Director of the Developmental Learning Center, Olathe Unified School District 233, 1005 S. Pitt, Olathe, Kan. 66061; 913/782-8950.***

Braille work station

Advanced technology is helping visually impaired students in one Michigan district with their schoolwork. The Macomb Intermediate School District has set up Braille work stations equipped with computers, Braille printers, and other specialized equipment. Now, teachers can create lessons for blind students quickly and easily; those lessons can be printed either in standard type, large print, Braille, or a combination of those types. The stations also enable students to hand in reports and other homework assignments in Braille; the special printer converts the Braille to printed copy, which is easy for the teacher to read. ***For more information, contact D. Ralph Pritchard, Curriculum Resource Consultant, Macomb Intermediate School District, 44001 Garfield Road, Mt. Clemens, Mich. 48044; 313/759-6595.***

Computer mentor

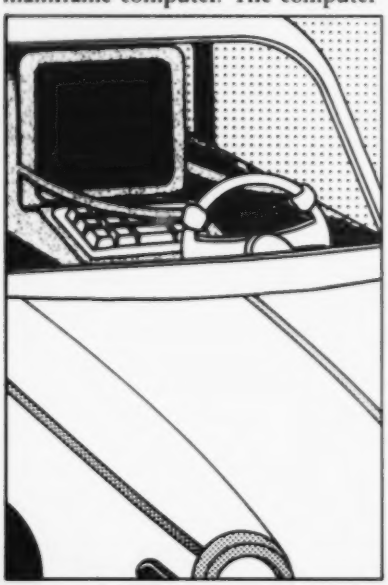
Two California districts have created high-tech schools-within-a-school to prepare their students for the computer age. The Poway Unified School District opened the Institute of Applied Technology at its high school with a $90,000 grant from the state. Students, after being trained in computer fundamentals, work for major companies in the area. A professional mentor, in coordination with the classroom teacher, assigns the student a company project and provides training, equipment, and other resources. Students often work on high-level projects. The program gives students "the opportunity to develop skills and use equipment in the applied sciences that we never could have hoped to provide in a high school setting," says Principal David K. Hughes. ***For more information, contact David K. Hughes, Principal, Poway High School, Poway Unified School District, 15500 Esppola Road, Poway, Calif. 92064; 619/748-0245.***

Magnet school

The Fullerton Union High School District in California has Troy Tech, a center for advanced technological studies, at its high school. Started with nearly $300,000 in grant money from the state, the magnet program has two major areas of study: one in advanced mathematics, science, and engineering for those who want to go to college and graduate school; and one in applied high technology for students who have vocational goals (automotive technology, for instance) in mind. The program, which began last fall, already has an enrollment of 120 students from the school district and from surrounding districts in Orange County. ***For more information, contact Jacqueline B. Reedy, Troy Tech Coordinator, Troy High School, Fullerton Union High School District, 2200 E. Dorothy Lane, Fullerton, Calif. 92631; 714/870-3615.***

Computerized placement

One Michigan district with high student turnover is using a computerized information system to enroll and place new students in their appropriate grades quickly and efficiently. The Southfield Public Schools, near Detroit, operate a central evaluation process through the district's central registry. A new student's demographic data, plus his scores on standardized reading and mathematics tests, are entered into a mainframe computer. The computer prints out the student's profile and test results. This information enables district staff members to place the student in the right grade in the right school. At the assigned school, the new student meets with his counselor; his courses and schedule are added to the information already stored in the computer. In operation for less than a year, the district's registration system has saved time and improved the placement process, say school officials. ***For more information, contact Thomas A. Schultz, Director of Information Systems and Technology, Southfield Public Schools, 24661 Lahser Road, Southfield, Mich. 48034; 313/423-8512.***



Take-home computer I

Disadvantaged elementary school students can take computers home to help them master basic skills in the Alhambra School District in Arizona. Supported by federal Chapter 1 funds for disadvantaged students, the Take Home Computer Program serves several purposes: It reinforces the basic skills taught in the classroom; it teaches computer literacy skills to both students and their parents; and it involves parents in the educational process. ***For more information, contact Jim Rice, Director of Special Services, Alhambra School District, 3001 W. Hazelwood, Phoenix 85017; 602/246-5110.***

Take-home computer II

Students aren't the only ones who can take computers home. In the Timberlane Regional School District in New Hampshire, junior high school teachers have received computers and printers, to use at home or in school, to help them reduce paperwork, map out lesson plans, or write letters to parents. The district and the state spent $60,000 to train teachers and equip them with basic hardware and software, which they can keep as long as they work for the school district. The teachers seem to be meeting the program's goal—to rechannel the time normally spent on paperwork into teaching children. ***For more information, contact Judith A. Deshaies, Assistant Principal, Timberlane Regional Junior High School, Greenough Road, Plaistow, N.H. 03865; 603/382-7131.***

Management information

It's the principal's turn to use computers in one New York State school district. Three principals in Greenburgh Central School District 7 are using personal computers and a principal's management information system to run their schools more effectively. Each principal has access to every student's biographical data and scores on state and standardized tests. The principals can use that information to pinpoint what lessons an individual, a class, or the entire school might need to master, or they can use the same data to analyze more complex, long-range problems. Principals also can use the system for purely administrative tasks, such as making class rosters, changing class assignments, or keeping attendance records. ***For more information, contact Helyne Robin, Public Information Consultant, Greenburgh Central School District 7, 475 W. Hartsdale Ave., Hartsdale, N.Y. 10530; 914/761-6000, ext. 217.***

Computerized library

Seventh grade students in Huntington Beach, Calif., can order books from the public library without leaving their classroom. Using a computer and a modem, they dial into the library's card catalog to search for books for schoolwork and for pleasure reading. From time to time, a volunteer parent, trained by the library, takes the book requests and a corporate library card issued to the class and retrieves the books. Students either return the books on their own or wait for the volunteer to make a return trip. Benefits of this library link program are many, says teacher Wanda Baral: "Students who once snubbed the library now are motivated. I also see that students are learning to follow directions on their own. If they don't follow instructions, they can't link up." ***For more***

information, contact Wanda Baral, Crest View School, Ocean View District, 18052 Lisa Lane, Huntington Beach, Calif. 92646; 714/847-1270.

Library research

Another library program, this one in Roanoke, Va., gets children to do library research to find out how to "save the earth from invaders." The district's libraries, which have been transformed into information centers, use an adventure video series—a *Star Trek* for kids—to teach research and critical thinking skills. The libraries also use films and video programs to teach robotics. Once students understand the concepts, they learn to operate Rosco, a three-foot, mobile, remote-controlled robot that has a chest of gadgets and working mechanical arms. ***For more information, contact Frank P. Tota, Superintendent, Roanoke City Public Schools, P.O. Box 13145, Roanoke, Va. 24031; 703/981-2381.***

Computer tutor

Need something done on a computer? Ask a student. Some sixth grade students in Clayton, Mo., are acting as computer tutors. Each week, the students meet with their teachers to see what work on the computer needs to be done. Equipped with their job orders, they create signs, banners, or other computer-based graphics to enhance a curriculum area or a classroom. Each student gets an operator's license and access to the computer laboratory at otherwise inaccessible times. Results: "The students are bursting with self-esteem and have created real bonds of friendship with their teachers," says teacher Jacquelyn Lipsitz. ***For more information, contact Jacquelyn Lipsitz, Glenridge School, School District of Clayton, 7530 Maryland Ave., Clayton, Mo., 63105; 314/726-2355.***

Build a computer

High school students in one industrial science course are learning not only to use computers, but how to build them as well. Concerned that enrollment in industrial education courses was falling, the Los Alamos (New Mexico) schools decided to make their electronics courses more relevant. With the help of the Radio Shack Corp., the school district designed a curriculum to help students build computers from kits, learn enough electronics to understand how computers work, and diagnose and repair minor problems. Once the computers are built, students in the course can buy them or the district can use them or sell them to other students or community residents. As for enrollment in electronics, it's up by almost a third. ***For more information, contact Walter Smith, Superintendent, Los Alamos Schools, P.O. Box 90, Los Alamos, N.M. 87544; 505/662-4141.***

Plan for the future I

A five-year technology plan is helping one midwestern school system gear up for the future. The Penn-Harris-Madison School Corp. in Indiana is not waiting for the ultimate technology; it's working hard to find current technologies

that are flexible enough to adapt to new program needs. The plan outlines the district's instructional and management needs and makes recommendations for decisions to be made through 1991. Among the plans: a major renovation of the district's high school and a new telephone system. ***For more information, contact Richard Hardt, Director of Planning and Community Services, Penn-Harris-Madison School Corp., P.O. Box 302, Osceola, Ind. 46561; 219/259-7941.***

Plan for the future II

Another five-year plan, this one fully automated, is helping a Connecticut district know where it's going educationally and how much it will cost to get there. The Trumbull School District has developed a computer-based plan for curriculum, staff development, testing, student activities, and support services. Superintendent Edwin T. Merritt developed the planning model, which also includes budget projections; the plan then was reviewed by the school community. Merritt now presents an automated, quarterly report card that compares the progress made with the plan's objectives. ***For more information, contact Edwin T. Merritt, Superintendent, Trumbull School District, 6254 Main St., Trumbull, Conn. 06611; 203/261-3801.***

Role of technology

A three-year study on the role of technology in education is helping many Michigan school districts ask, and answer, key questions about technology. Michigan policymakers and education and community leaders at both state and regional levels have identified 11 main policy areas—from developing a staff to gaining public acceptance to establishing equity. The Michigan Association of School Boards, working with regional school districts, is helping local school systems use the study for good decision making and appropriate policy setting. The program is called "Technology Challenge of the '80s—From Dream to Reality." ***For more information, contact Rae Levis or Ron Sniderman, Wayne County Intermediate School District, 33500 Van Born Road, Wayne, Mich. 48184; 313/467-1569.***

Technology consortium

A Regional Consortium for Education and Technology is giving school districts in the St. Louis area a variety of services they could not afford on their own. The three-year-old consortium, which has nine full-time employes, offers computer courses, sponsors an annual

conference, and helps schools and districts buy equipment and supplies at lower prices. The consortium has an electronic bulletin board that lets teachers and administrators (using their own computers and modems) communicate with each other. This year, the consortium also set up an electronic communication system for students. ***For more information, contact Carl Hoagland, Executive Director, Regional Consortium for Education and Technology, 10601 Clayton Road, St. Louis 63131; 314/991-3447.***

Computer telephone calls

If you can't reach working parents during the day, use a computerized telephone system to call them at night. That's what one Illinois district does. In fact, the Maine Township High School District 207 uses computers for a wide range of administrative and academic tasks. Counselors, with microcomputers linked to the mainframe computer in the district office, can make immediate schedule changes or check student test scores. Parents of college-bound students can use a software program to see if their child qualifies for financial aid. ***For more information, contact Joel W. Morris, Director of Instruction, Maine Township High School District 207, 1131 S. Dee Road, Park Ridge, Ill., 60068; 312/696-3600.***

Academic tracking

The Ardmore (Oklahoma) City Schools use computers to keep close track of student progress in mathematics and language arts courses. Two years ago, the school system put into effect a mastery system that lets students move ahead once they master certain educational objectives. But the accompanying record-keeping was cumbersome, says Director of Instruction Deanna J. Broughton. Now, a computerized mastery management system helps teachers pinpoint each student's skills, diagnose problems, and keep parents informed of progress. ***For more information, contact Deanna J. Broughton, Director of Instruction, Ardmore City Schools, P.O. Box 1709, Ardmore, Okla., 73402; 405/226-7650.***

Computerized lesson plan

The Oakland Schools in Michigan are making the most of commercial software programs. Through a special project, teachers are learning to develop lesson plans that integrate exemplary software with curriculum objectives. The project helps teachers examine both the curriculum and the software to determine where there is a fit and to use the software in appropriate ways. ***For more information, contact Lynn M. Lieberman, Instructional Computing Consultant, Oakland Schools, 2100 Pontiac Lake Road, Pontiac, Mich. 48054, 313/858-1991.***

Writing instruction

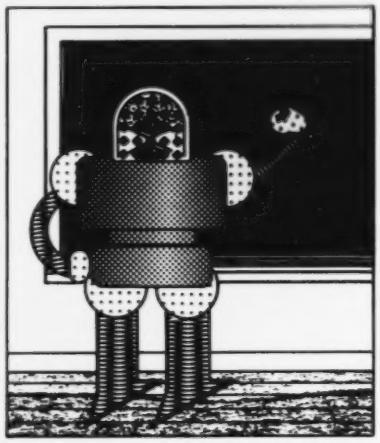
High schools in the Amarillo Independent School District in Texas use computers to improve student writing skills. Each English department has a computer laboratory dedicated to writing instruction—a high priority in the school district. Results have been good, says Kay Bowerman, director of computer instruction. Students are enthusiastic, willing to revise their work, and eager to share their writing with peers. And papers are easier for teachers to grade, too. ***For more information, contact Kay Bowerman, Director of Computer Instruction, Amarillo Independent School District, 910 W. 8th St., Amarillo, Texas 79102; 806/376-5531.***

Computer use

High school students in another district are learning to be effective computer users and consumers. The Blair (Nebraska) Community Schools teach skills—word processing, work with data bases and spreadsheets—that easily carry over to the home or business world. The training gives students the ability to use the computer as a tool in a variety of settings and not simply at school. ***For more information, contact Patricia Ann Nun, Blair Junior/Senior High School, Blair Community Schools, P.O. Box 288, Blair, Neb. 68008; 402/456-7375.***

Individualized instruction

Computer laboratories in one school district are giving students the most instruction for the money. The Dearborn (Michigan) Public Schools use a large system with 30 work stations to provide computer-managed instruction for English, reading, and mathematics. Teachers



bring their classes to the laboratories, set up in two schools, for sessions several times a week. The system's most important feature: It individualizes instruction for students and lets teachers become managers of learning. ***For more information, contact Jim Petrie, Computer Managed Instruction Laboratory Coordinator, Dearborn Public Schools, 13800 Ford Road, Dearborn, Mich. 48126; 313/582-5496.***

Computer laboratory

And in one California high school, a new computer laboratory with 35 terminals helps students learn word processing and basic programming. The system has two key features: a multiuser ability that lets everyone connected to the system perform different tasks at the same time; and a multitask feature that allows students to do more than one thing at the same time. The system has given teachers flexibility in classroom structure and course content. ***For more information, contact Sharon Anderson, Business Education Department Chairman, Apple Valley High School, Victor Valley Union High School District, Victorville, Calif. 92392; 619/247-7206.***

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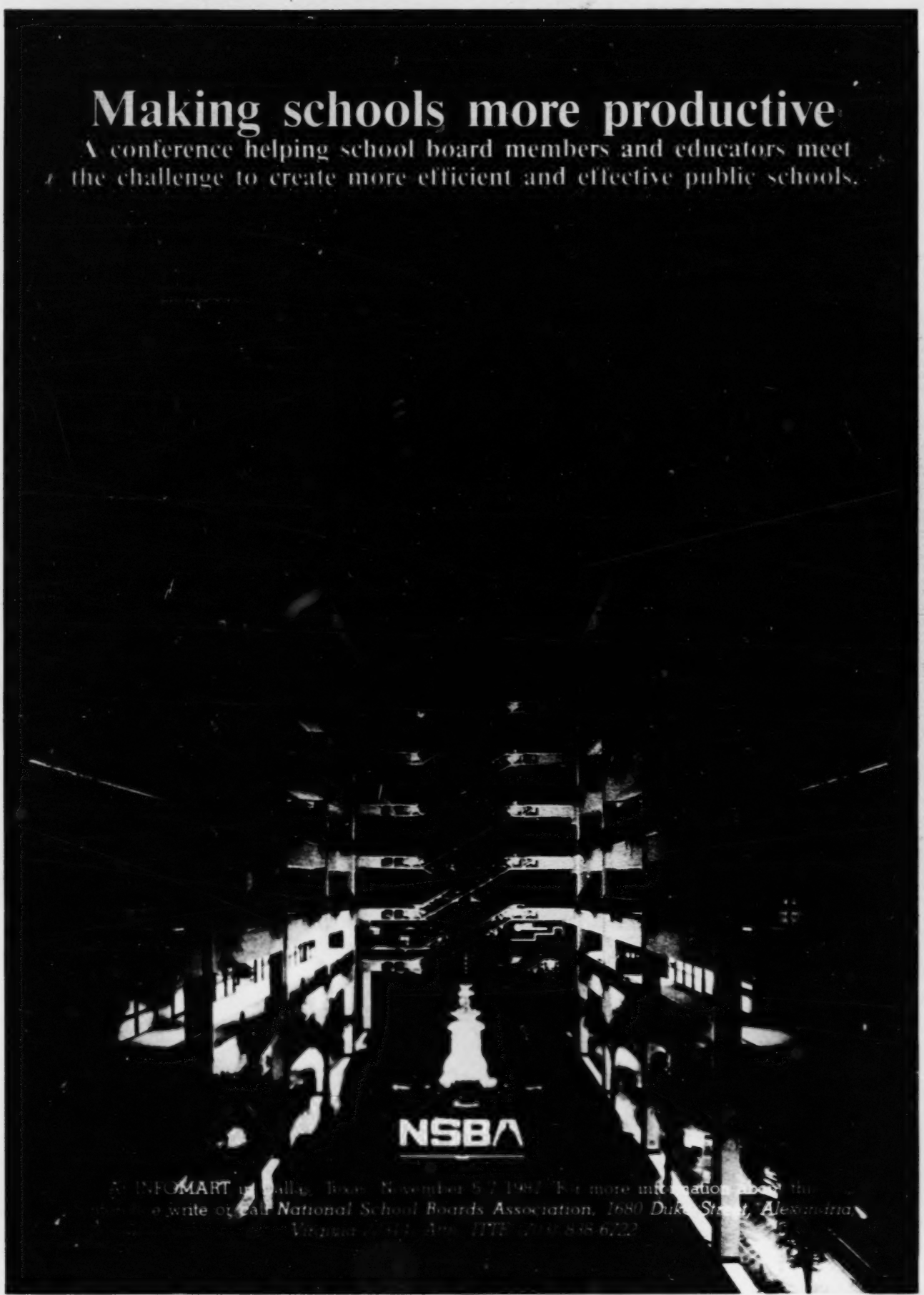

At INFOMART in Dallas, Texas, November 5-7, 1987. For more information about this conference write or call: National School Boards Association, 1680 Duke Street, Alexandria, Virginia 22314. (703) 838-6722.